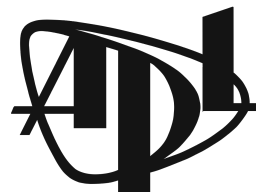


# An Annual Cycle of Upper Ocean Salinity Captured by High-Resolution Glider Survey



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# Seaglider Program

## HIGHLIGHTS:

- 3 gliders have been operating for over **120 days** and are (relatively) healthy.
- Nearly **1200 dives** completed, covering a total horizontal distance of +5000 km
- **2110 profiles** of temperature microstructure of the upper ocean, equivalent to a vertical distance of 500 km of turbulence data.
- We will be able to do very good budgets with all the SPURS data.

## GOALS:

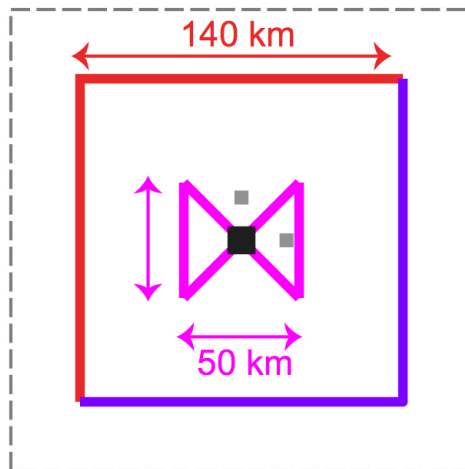
Over deployments lasting an **entire year**:

Resolve  $S$ ,  $T$ ,  $\rho$ , and  $u$  in the upper 1000 m in 200 km by 200 km box centered on the mooring, over temporal scales of **14 days** and spatial scales of **50 km**.

**Direct estimate** of the rate of **turbulent dissipation** in the thermocline and at the base of the mixed layer.

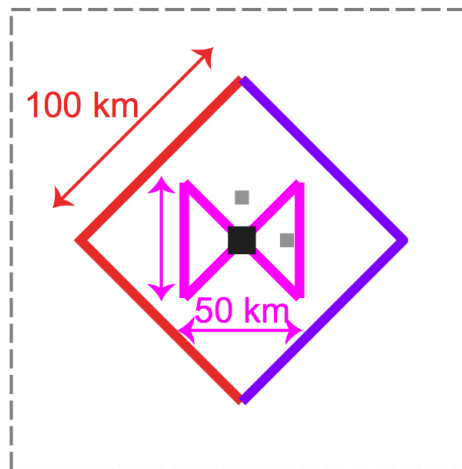
# Sampling patterns (and real life...)

140-km box pattern  
~14 days



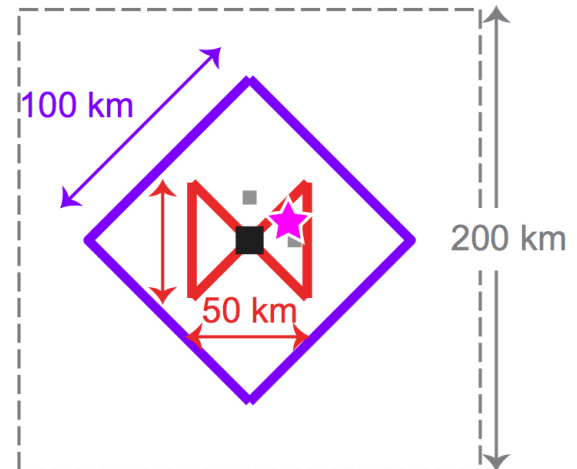
Sept. – Nov.

100-km box pattern  
~14 days



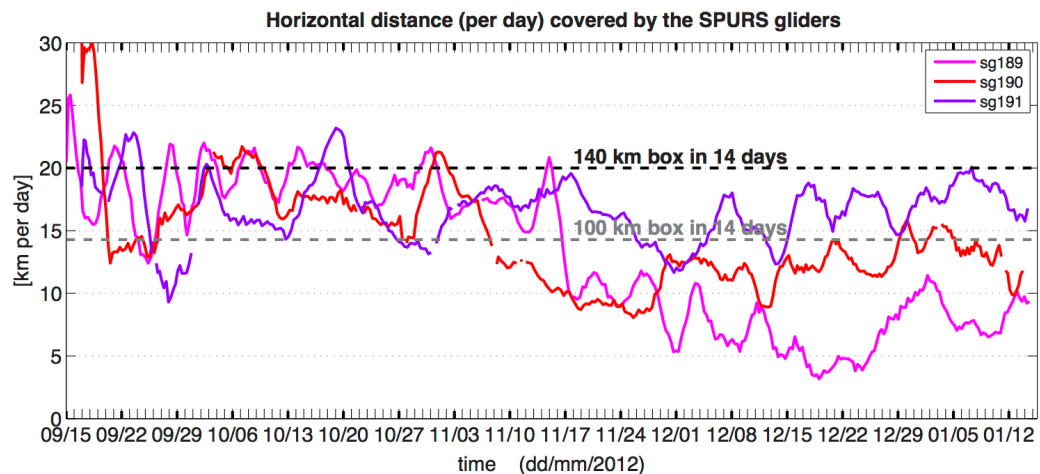
Dec.

100-km box pattern  
~21 days

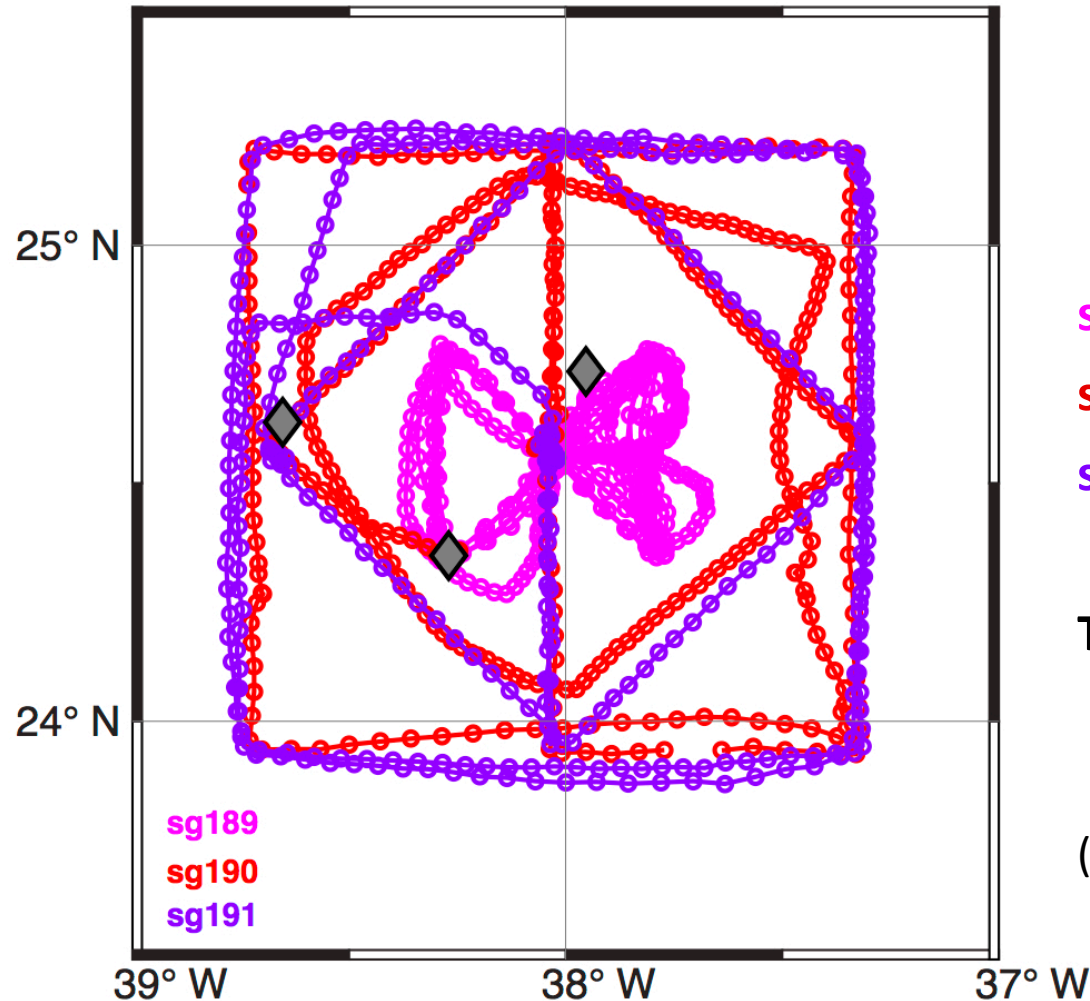


Jan – Mar?

The speeds over ground (and our ability to steer accurately) have been decreasing over time...  
Increased drag due to biofouling?



# Seaglider tracks



... as of 1/14/2013 (Monday)

**sg189:** 388 dives (track :1555 km)

**sg190:** 392 dives (track :1595 km)

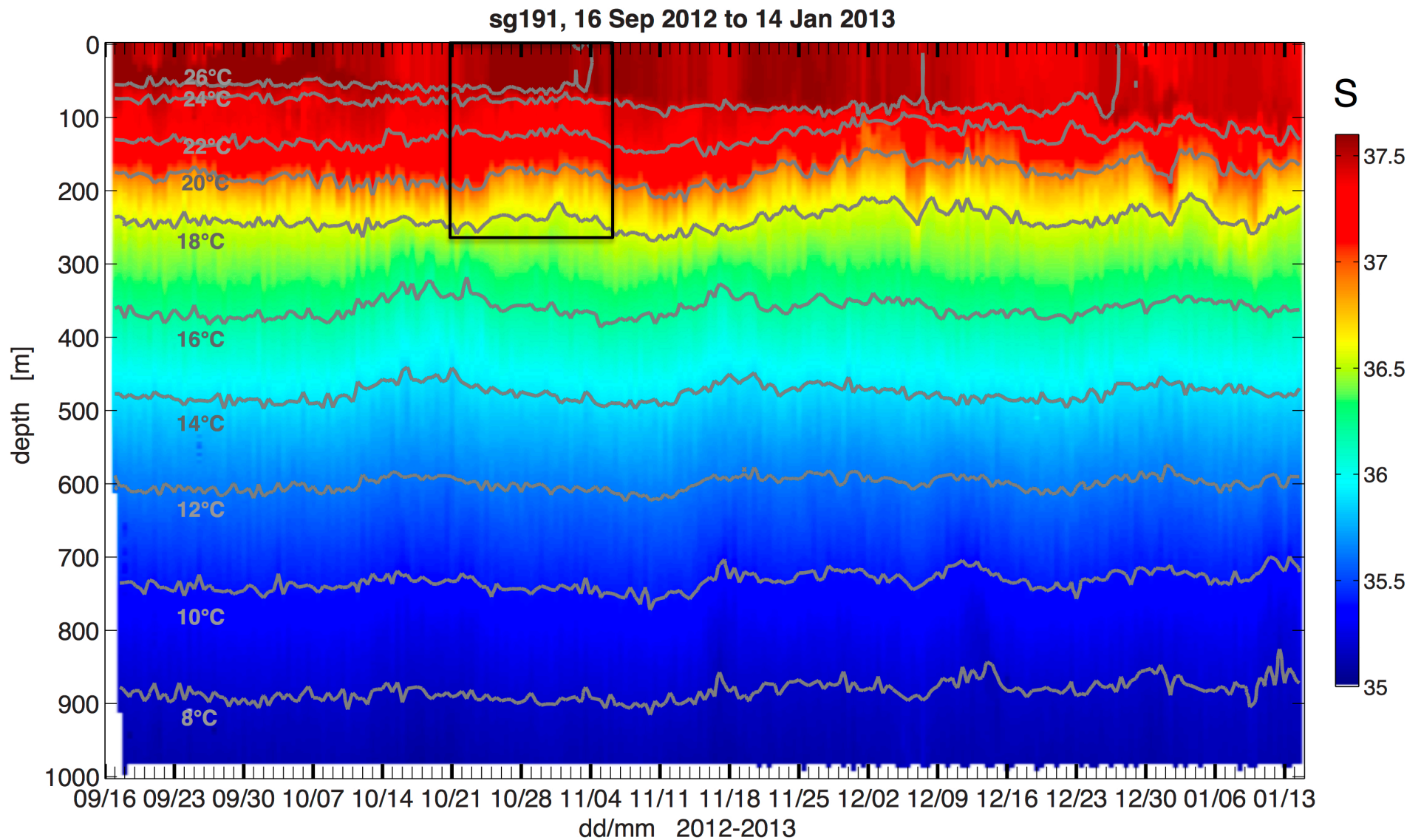
**sg191:** 366 dives (track :1885 km)

**The 3 gliders have covered over  
5000 km in 4 months**

(Miami to Seattle is about 4500 km)

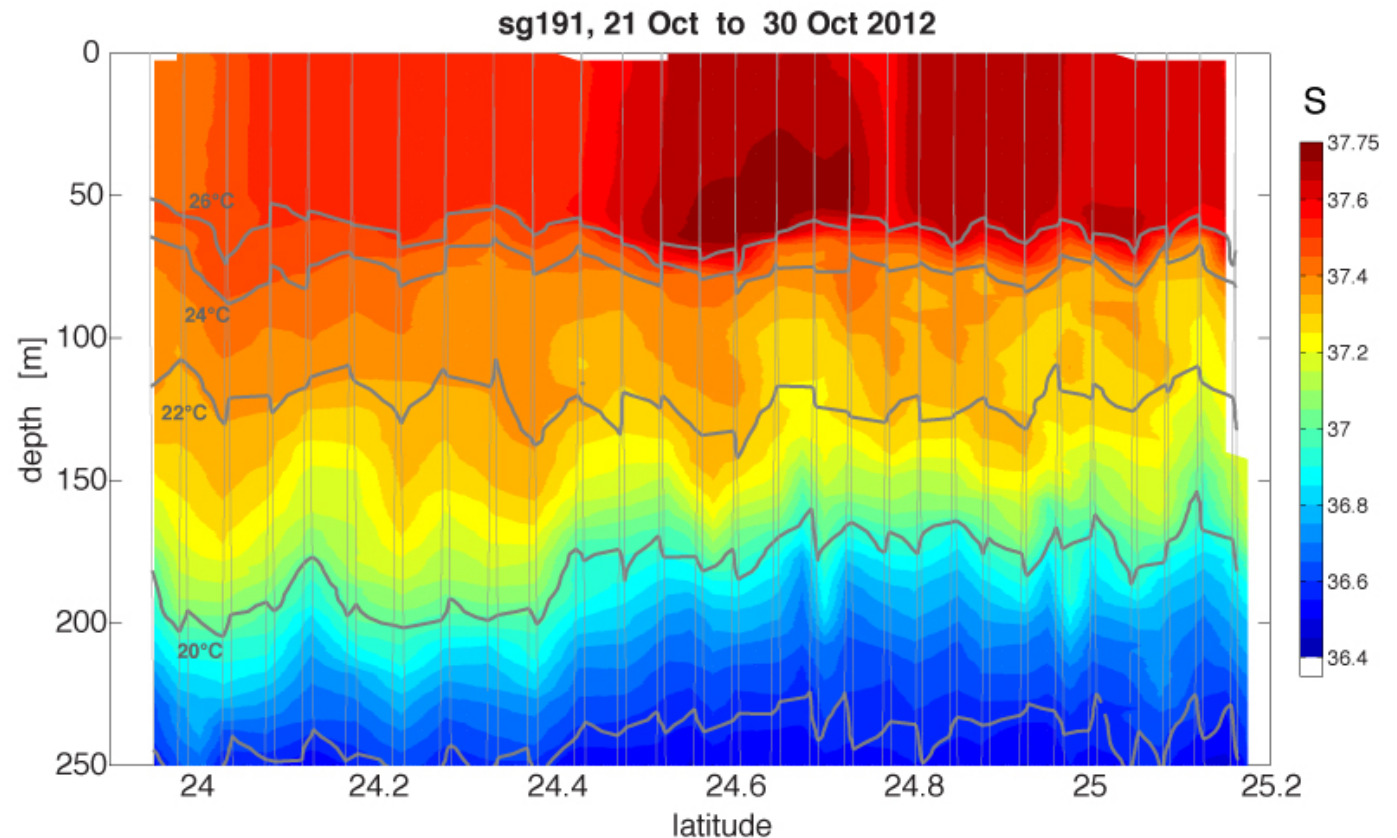
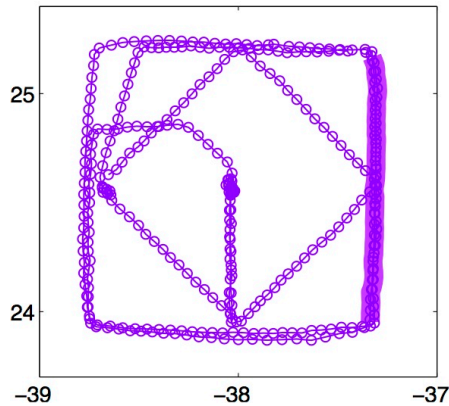


# Time series of salinity



sg191: 366 dives

# North-South section (140 km)



Single section from **sg191**, collected over **one week** (28 dives), showing complex **intrusions**, **internal waves**, **mesoscale eddies**, etc.

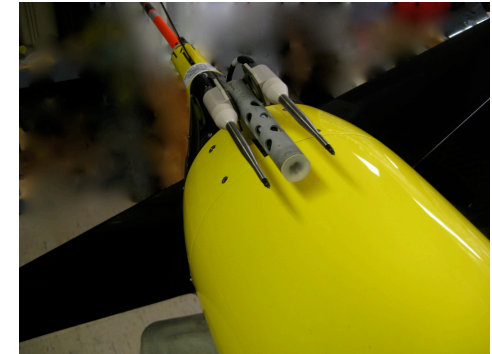
# Turbulence microstructure

## Dissipation measurement from Seaglidors

Fully integrated system, developed at APL.

Does not affect flight and endurance (except for power limitation).

Real-time data processing and transmission of turbulence profile after each dive.

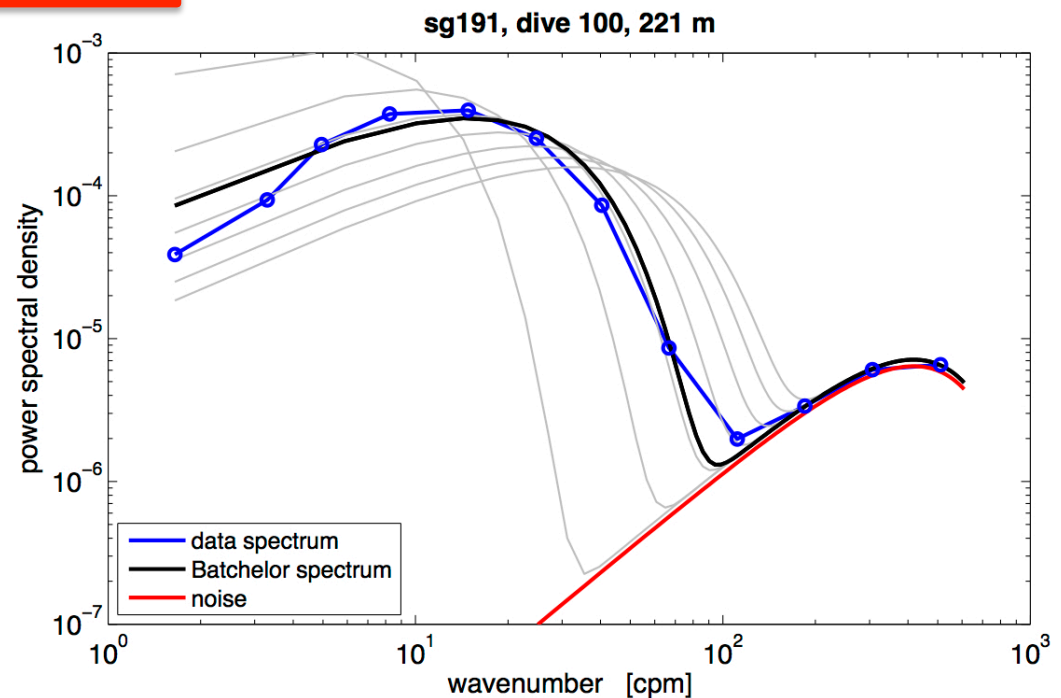


### Overview of the method:

Spectra are calculated onboard on 10s blocks (1-2 m).

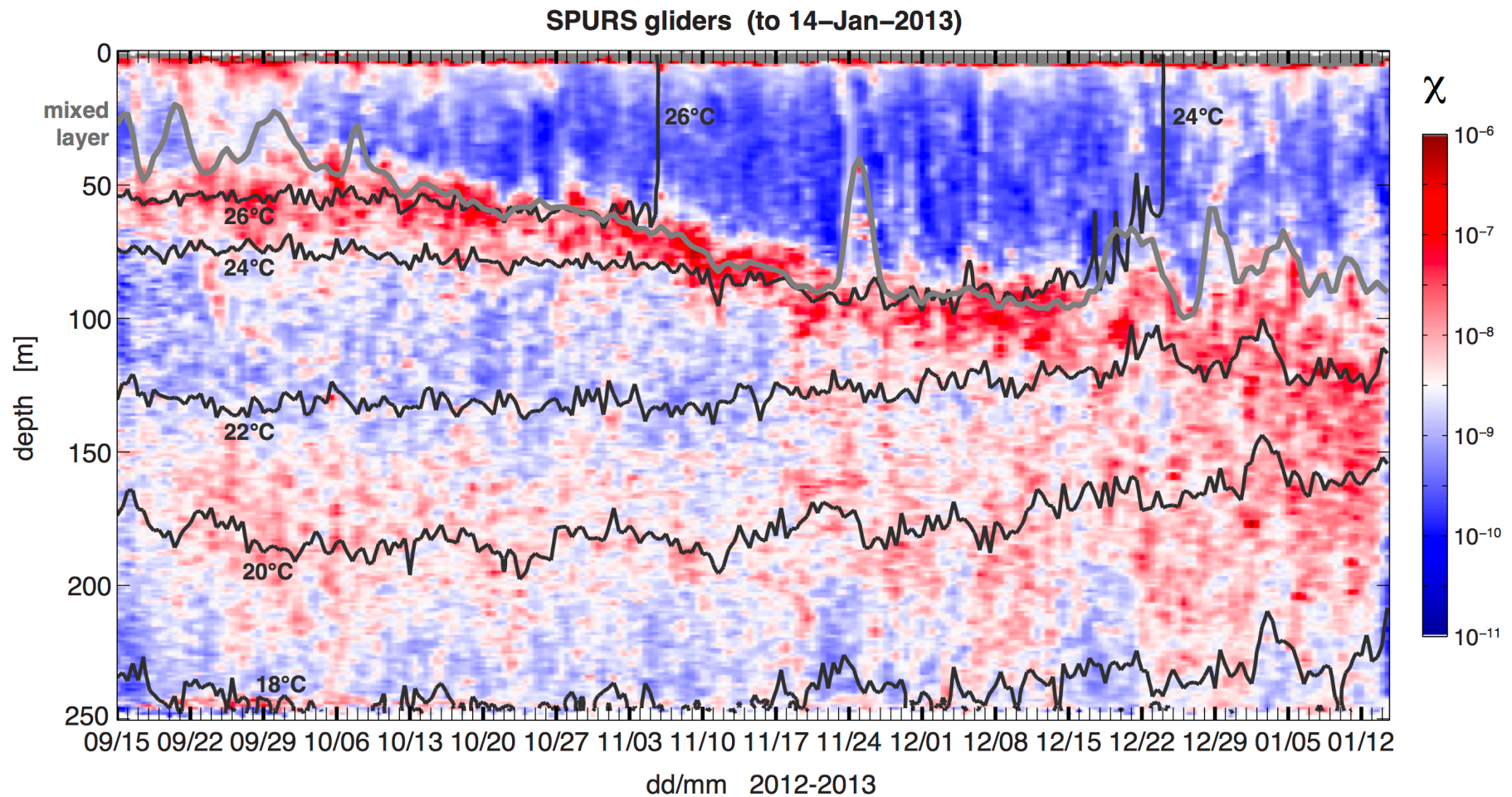
Log-averaged spectra (12 points per block) are sent back at the end of each dive.

Estimate  $\chi$  and  $\varepsilon$  by fitting the Batchelor spectrum to the data.





# Turbulence microstructure



over 2100 profiles for all 3 gliders.

# Ongoing analysis

- sg189, sg190, and sg191 will be **recovered** at the end of March 2013.
- 3 new gliders will be **deployed**, to stay until Sept 2013.
- The analysis will involve a close synergy with the float program, and mooring groups.
- SPURS data will allow us to estimate **internal waves and the mesoscale eddy field**.
- **Objective maps** with gliders, floats, and moorings.
- During the Sept 2012 cruise, gliders did 167 dives near the moorings...
  - Calibration of sensor with the mooring data and uCTD.
  - Intercalibration of gliders.
  - Comparison with turbulence SLOCUM glider and VMP.

*Map of Seaglider data collected in September 2012*

